# Chapter 1
# Introduction

## 1-1. Purpose

This manual provides engineering personnel with design guidance to select, specify, inspect, and approve lubricants and hydraulic fluids used for U.S. Army Corps of Engineers (USACE) equipment. It provides the operation and maintenance staff with guidance for regular and scheduled maintenance. The manual gives broad-based instructions reflecting established criteria and the latest proven state-of-the-art technology and techniques to attain better and more economical lubrication.

## 1-2. Applicability

This manual applies to all USACE commands having civil works responsibility.

## 1-3. References

Required publications are listed below. Related publications are listed in Appendix A.

*a.* 21 CFR 178.3570. Lubricants with Incidental Food Contact

*b.* 29 CFR 1210.1200. Safety and Health Regulations for Workers Engaged in Hazardous Waste

*c.* 29 CFR 1910.1200. OSHA Communication Standard

*d.* 40 CFR 110. Discharge of Oil

*e.* 40 CFR 112. Oil Pollution Prevention

*f.* 40 CFR 113. Liability Limits for Small Onshore Storage Facilities

*g.* 48 CFR 9.2. Federal Acquisition Regulation and Qualification Requirements

*h.* EM 1110-2-3105. Mechanical and Electrical Design of Pumping Stations

*i.* EM 1110-2-3200. Wire Rope Selection

*j.* EM 1110-2-4205. Hydroelectric Power Plants, Mechanical Design

*k.* CEGS 15005. Speed Reducers for Storm Water Pumps

## 1-4. Distribution Statement

Approved for public release, distribution is unlimited.

## 1-5. Scope

*a.* This manual is intended to be a practical guide to lubrication with enough technical detail to allow personnel to recognize and easily discern differences in performance properties specified in manufacturers' product literature so that the proper lubricant for a particular application is selected.

*b.* The manual defines and illustrates friction, wear, and corrosion and how they damage contact surfaces to cause premature equipment failure. It examines the mechanics of hydrodynamic, boundary, extreme pressure, and elastohydrodynamic lubrication to protect against surface deterioration. In practice, manufacturers' laboratories can tailor-make a lubricant for any equipment operating under any conditions by using the right combination of lubricants and additives. This manual describes basic characteristic properties of oils, hydraulic fluids, greases, solid lubricants, environmentally acceptable lubricants, and their additives. Separate chapters are devoted to lubricant specification and selection, and requirements of lubricants for equipment currently in use at USACE civil works facilities. Because conscientious adherence to lubrication schedules is the best prescription for longevity of component parts, operation and maintenance considerations are also addressed.